Energy efficiency trends and policies

Overview

In 2023, final energy consumption (including climate correction) in Spain has fallen by 1.5% to 77 Mtoe, which is 1.1% and 8.8% below the levels of 2000 and 2010, respectively. This recent development has taken place against a backdrop of economic recovery, both in Spain and globally, aided by the easing of bottlenecks in raw material supply chains following the pandemic, slowing inflation and lower energy prices, although it has not been without disruption due to the war in Ukraine. In the period 2000-2023, transport remains dominant, accounting for 42% of consumption in 2023. The buildings sector (residential and non-residential) accounts for 31% of consumption, of which 59% corresponds to housing. Industry has lost ground, both in terms of consumption and its contribution to GDP, in line with tertiarization of the economy, reaching 24% of consumption in 2023, 9 pp below 2000 and 1 pp below 2010. Agriculture accounts for 3.4% of consumption, a figure similar to that of 2022 and 0.8 pp higher than in 2010.

Figure 1: Final energy consumption by sector (with climatic corrections)



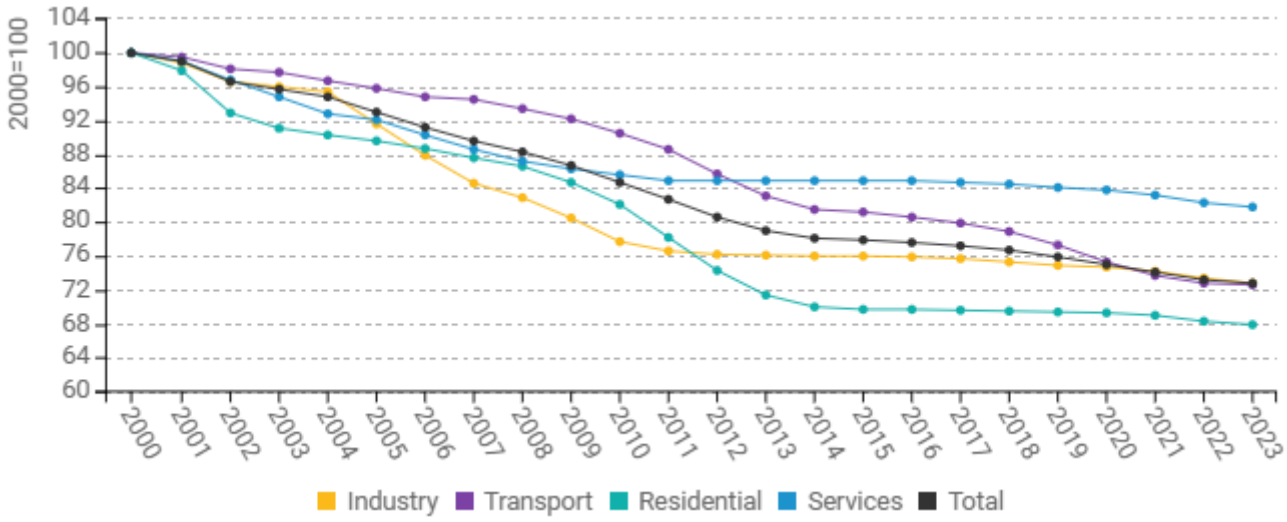
Source: ODYSSEE

According to the ODEX index, global energy efficiency has improved by 27.2% (1.4%/year) in the period 2000-2023. The residential sector leads the way with an improvement of 32.1% (1.7%/year), driven by technological and regulatory developments in building and equipment, among other factors. However, since 2010 this improvement has slowed, with a rate of 0.6%/year in the period 2019-2023. Transport follows with an improvement of 27.4% (1.38%/year), although the greatest progress has occurred more recently, with significant progress since 2010 (1.7%/year), more than three times that of industry. Industry has seen an improvement of 27.2% (1.37% per year), with most of this progress concentrated in the period prior to the 2008 crisis, with an increase of 2.3% per year between 2000 and 2008. The service sector shows less progress, at 18.2% (0.9%/year) in the period 2000-2023, with growth limited to 0.6%/year since 2010.

Figure 2: Technical Energy Efficiency Index

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

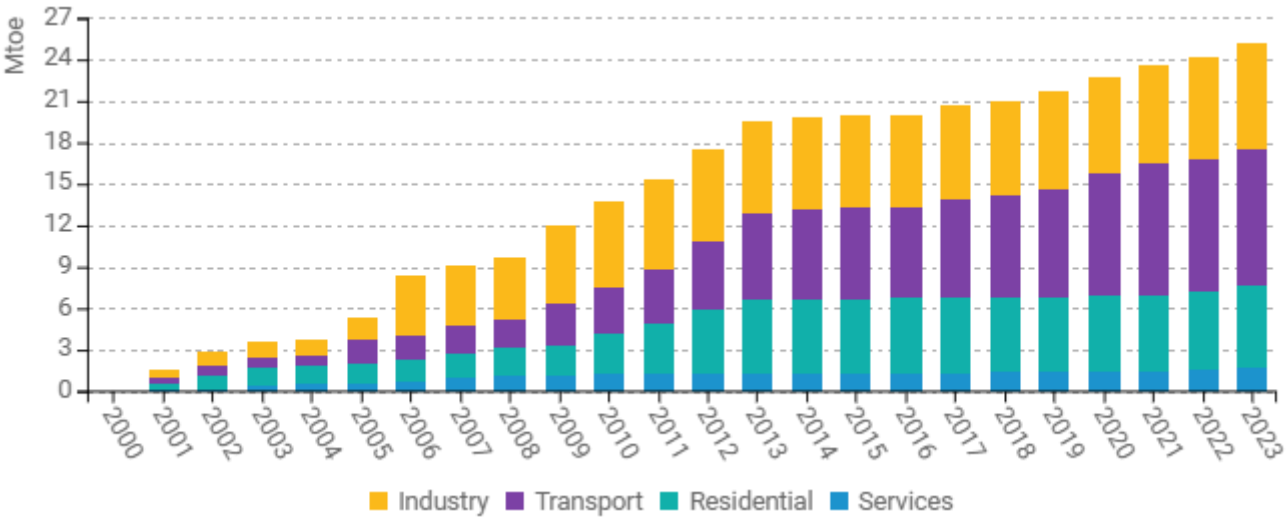
Co-funded by the European Union



Source: ODYSSEE

In Spain, transport and industry are the sectors that have accumulated the most savings since 2000, reaching 39% and 30% of accumulated savings by 2023, respectively. However, the residential sector, with 24% of savings in 2023, has been gaining relevance since 2008, with progress of 7.4%/year, positioning itself above industry (3.6%/year) and 3.5 pp below transport. In recent years, it is worth highlighting the positive effect of the transport aid programs approved under the Recovery, Transformation and Resilience Plan (PRTR) on improving the efficiency of this sector, thus contributing to the decarbonization of transport, in line with the objectives set by the Spanish NECP.

Figure 3: Energy savings by sector



Source: Odyssee

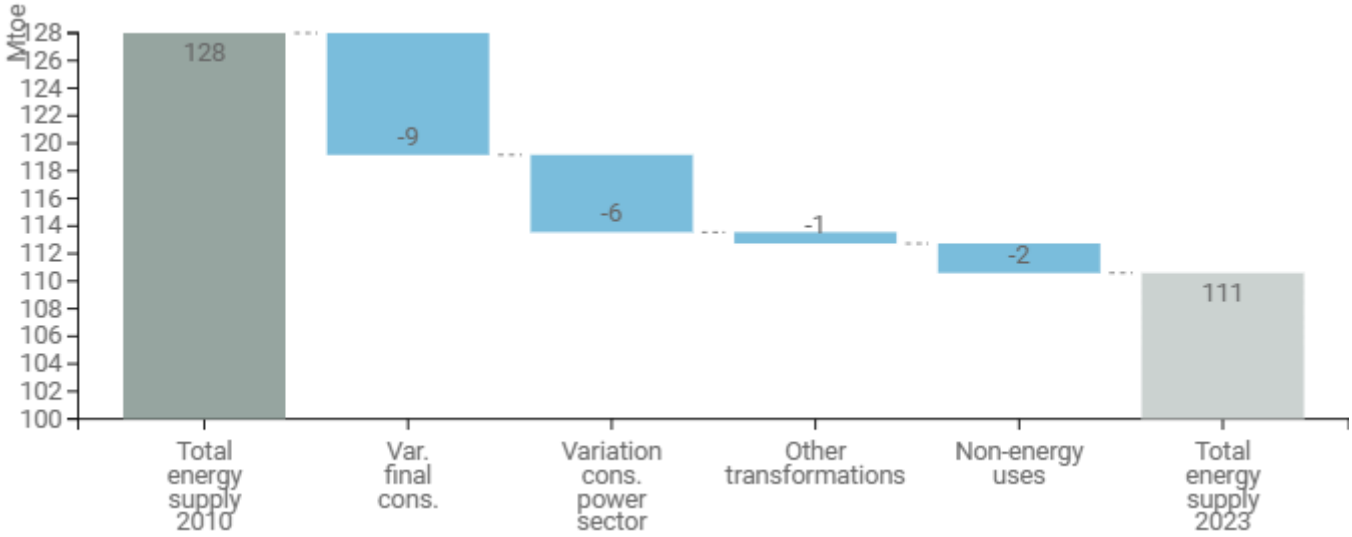
The energy supply structure in Spain has evolved towards greater diversification, with an increase in the share of renewable energies and natural gas. This change in the supply structure has had a positive effect on the efficiency of the energy transformation sector, thanks to the higher performance of these electricity generation

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

technologies, which translates into a reduction in consumption, reinforced by advances in energy efficiency. This trend continues despite the disruptions caused by various crises and subsequent phases of economic recovery. In this context, between 2010 and 2023, energy supply has decreased by 7.4 Mtoe, mainly due to the fall in consumption in end-use sectors (-8.8 Mtoe), associated with both efficiency improvements and structural effects linked to the crises, as well as the transformation of the transformation system (-5.6 Mtoe). Added to this are other factors such as the reduction in non-energy consumption (-2.1 Mtoe) and other changes in the energy transformation system (-0.8 Mtoe).

Figure 4: Main drivers of the total energy supply variation



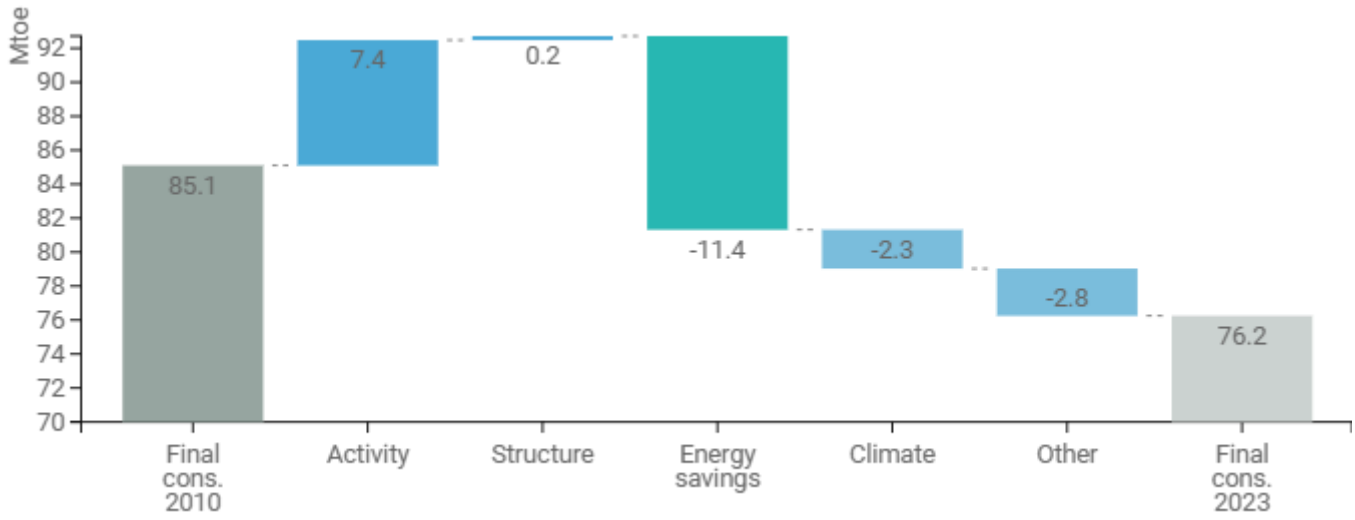
Source: Odyssee

Between 2010 and 2023, final energy consumption fell by 8.8 Mtoe, mainly due to savings resulting from energy efficiency policies and technological improvements (-9.2 Mtoe). Other additional factors contributing positively to this decline were the climate (-2.3 Mtoe), as a result of the increase in temperatures recorded in recent years — especially in 2022 and 2023, which were the first and second warmest years on record— as well as other effects (-5.2 Mtoe), including changes in household behavior induced by the various crises during the period and productivity improvements in the service sector. These effects have been partially offset by other factors such as increased activity (+7.7 Mtoe), associated with economic and demographic growth, and structural changes (+0.1 Mtoe), mainly in the industrial and service sectors.

Figure 5: Main drivers of the final energy consumption variation

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union



Source: Odyssee

The first National Integrated Energy and Climate Plan, PNIEC 2021-2030 (Spanish NECP), submitted on 31 March 2020 to the European Commission, is a planning instrument originating from Regulation (EU) 2018/1999 on Energy and Climate Governance. This first Plan assumed efficiency improvement targets for 2030 of 39.5% in terms of primary energy and 41.7% in terms of final energy (Art.3, Energy Efficiency Directive (EED) 2012/27/EU; 2018/2002). It also set a cumulative final energy savings target of 36.8 Mtoe between 2021 and 2030 (Art.7, EED 2012/27/EU; 2018/2002/EU) for which 10 sectoral measures out of a total of 17 efficiency measures were envisaged. In June 2023, the draft of the first update of the PNIEC as required by Regulation (EU) 2018/1999 (Art.14) was submitted to the Commission. The new PNIEC, approved by Royal Decree 986/2024 of 24 September, revises the previous targets upwards. Thus, the final energy efficiency improvement target is increased to 44% (Art.4 DEE 2023/1791). It also raises the final energy savings target to 53.5 Mtoe (Art. 8, EED 2023/1791/EU). This target should be achieved through the implementation of alternative measures in combination with the mechanisms that can be articulated within the National System of Energy Efficiency Obligations (SNOEE) with the resources of the National Energy Efficiency Fund (FNEE) and with the implementation of energy saving certificates. In its efficiency dimension, the new Plan presents 23 complementary measures, including those promoted by the Recovery Plan, the National System of Energy Efficiency Obligations, the Energy Saving Certificates, as well as alternative measures. 15 of these measures have a sectoral focus.

Table 1: Sample of cross-cutting measures

Measures	NECP measures	Description	Expected savings, impact evaluation
System of Energy Savings Certificates (RD	Yes	Through Royal Decree 36/2023, of 24 January, and within the scope of the National System of Energy Efficiency Obligations (SNOEE), a system of certificates is established by which it is	High

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

36/2023)		possible to achieve energy savings through the presentation of Energy Savings Certificates (CAE). The purpose of this CAE System is to contribute to the fulfilment of the final energy savings objective set according to the Energy Efficiency Directive (Art.7, EED 2018/2002/EU, Art. 8, EED 2023/1791/EU). These CAE must reflect the annual final energy savings recognized because of investments in energy efficiency actions, which must comply with the principles and methodology for calculating savings indicated in Annex V of the DEE.	
Law 7/2021, of 20 May, on Climate Change and Transition	Yes	This Law in force since 22 May 2021 aims to ensure compliance by Spain with the objectives of the Paris Agreement and facilitate the decarbonization of the Spanish economy and its transition to a circular model. The Law establishes a series of minimum objectives regarding the reduction of GHG emissions, penetration of renewables and improvement of energy efficiency. Specifically, in the field of efficiency, the aim is to reduce primary energy consumption by at least 39.5%. All these objectives may be revised upwards. The law includes as planning instruments to address the energy transition the National Integrated Energy and Climate Plan (Spanish NECP) and the Decarbonization Strategy for 2050 of the Spanish Economy. It also promotes a series of measures to achieve the established objectives. Among these measures, those aimed at energy efficiency stand out, with special emphasis on buildings and transport.	High
National Energy Efficiency Fund (NEEF)	Yes	The National Energy Efficiency Fund (FNEE) aims to finance mechanisms for economic and financial support, technical assistance, training, information, and other measures addressed at increasing energy efficiency in various energy-consuming sectors, so that they contribute to achieving the target set by the National System of Energy Efficiency Obligations (SNOEE), in accordance with the provisions of the Energy Efficiency Directive (Art. 7, EED 2018/2002/EU, Art. 8, EED 2023/1791/EU). This Fund is attached to the Ministry for the Ecological Transition and Demographic Challenge (MITERD) through the Secretary of State for Energy and is managed by IDAE.	High

Source: MURE

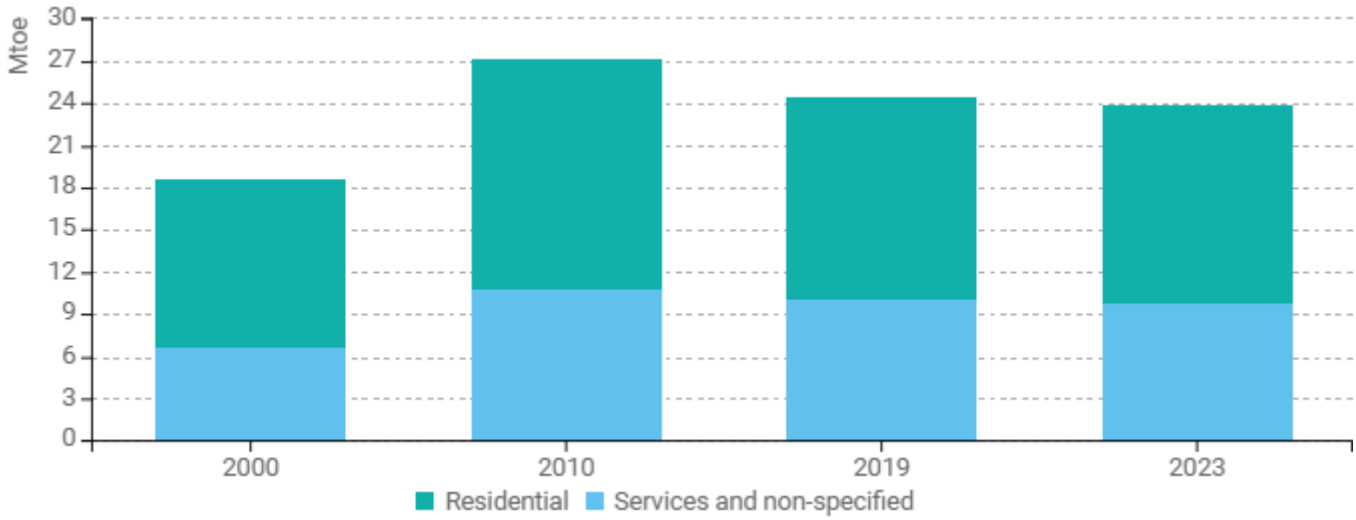
The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

Buildings

Consumption in buildings (including climate correction) has been gaining ground, surpassing industry since 2006 and peaking in 2010, with growth of 3.9%/year, more pronounced in non-residential buildings (+4.9%/year) than in residential buildings (+3.3%/year). From 2010 onwards, this trend reversed, with consumption falling at a rate of 1% per year to reach 24 Mtoe in 2023, 29% below the 2000 level. Since 2016, consumption in buildings has remained relatively stable, with around 60% corresponding to residential buildings.

Figure 6: Final energy consumption in buildings (with climatic corrections)



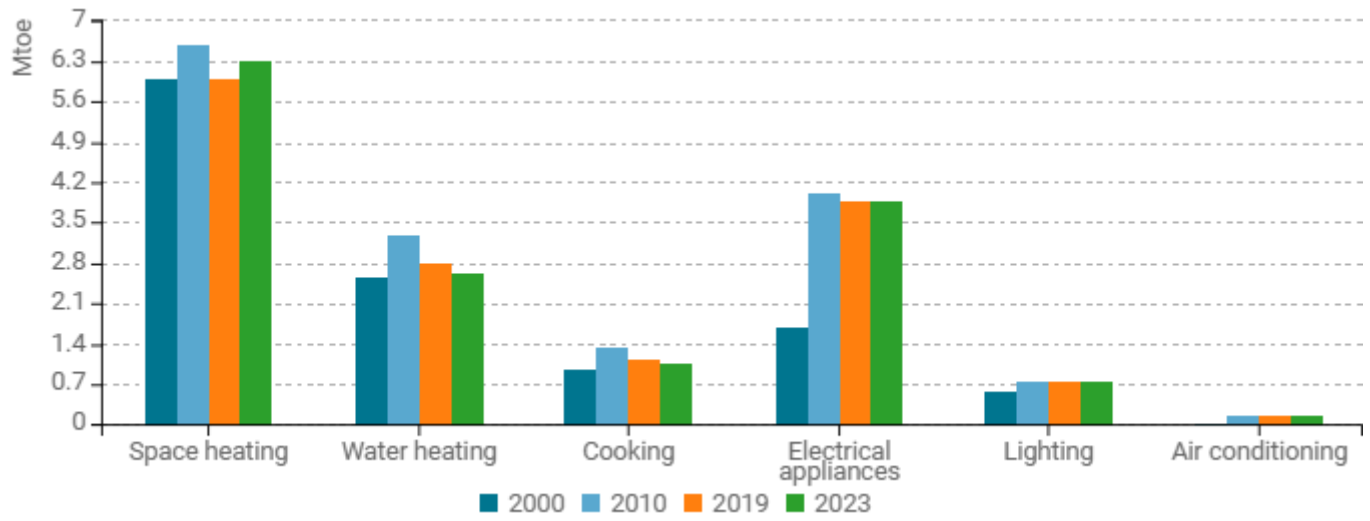
Source: Odyssee

In 2023, more than two-thirds of Spanish households' energy consumption (including climate correction) is concentrated in heating (43%) and electrical appliances (26%). These are followed by DHW (18%), lighting (5%) and air conditioning (1%). Since 2010, there has been an increase in the electrification of uses, driven by the purchase of electrical appliances and the growing incorporation of ICT technologies, favored by digitalization and, more recently, by teleworking. The consumption of these appliances increased by 9.1%/year between 2000 and 2010, before declining and stabilizing (-0.3%/year) in the period 2010-2023. Air conditioning, despite its limited representation, stands out for recording the highest increase in consumption in the period 2000-2010 (+16.8%/year). The remaining uses follow a similar consumption pattern increases until 2010, followed by decreases, with the largest falls (-1.8%/year) corresponding to heating and DHW.

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

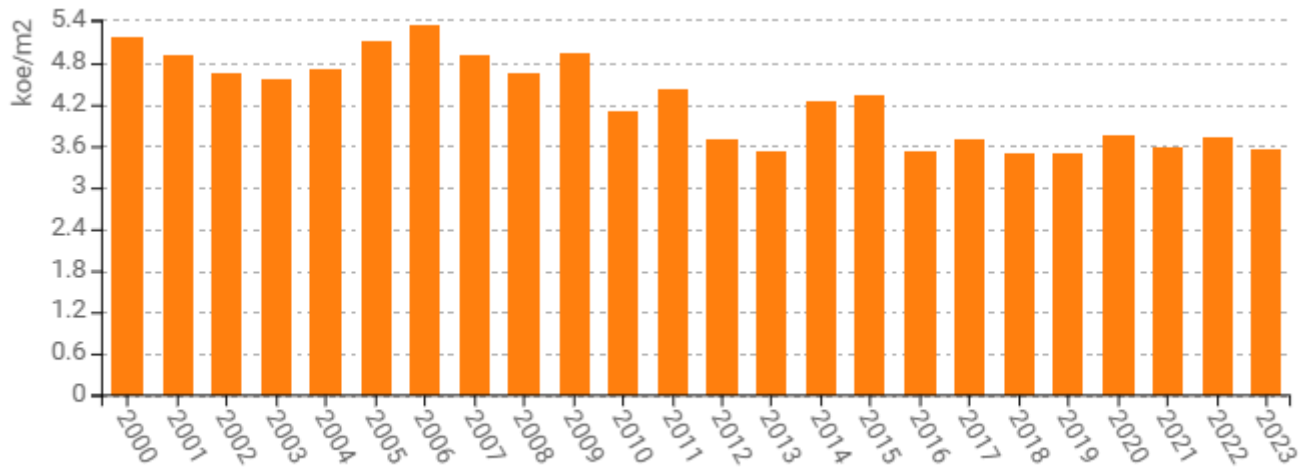
Figure 7: Energy consumption by end-use of households (with climatic corrections)



Source: Odyssee

Unit consumption of heating (kep/m2) shows irregular behavior in the period 2000-2015, with a peak in 2006, followed by a slight downward trend between 2008 and 2013, attributable to the impact of the crisis on household behavior, leading to more moderate consumption patterns. After a rebound in 2014-2015, coinciding with the economic recovery, consumption has shown a stabilizing trend since 2016, despite the disruptions caused by recent crises, especially the health crisis, standing at 3.54 kep/m2 in 2023, 34% below the 2006 level. This reduction in consumption is explained by various factors, such as improved efficiency in heating equipment, driven by the expansion of reversible heat pumps, the effect of energy renovation of homes, and milder winters, characterized by higher temperatures in recent years.

Figure 8: Energy consumption of household space heating per m2 (with climatic corrections)



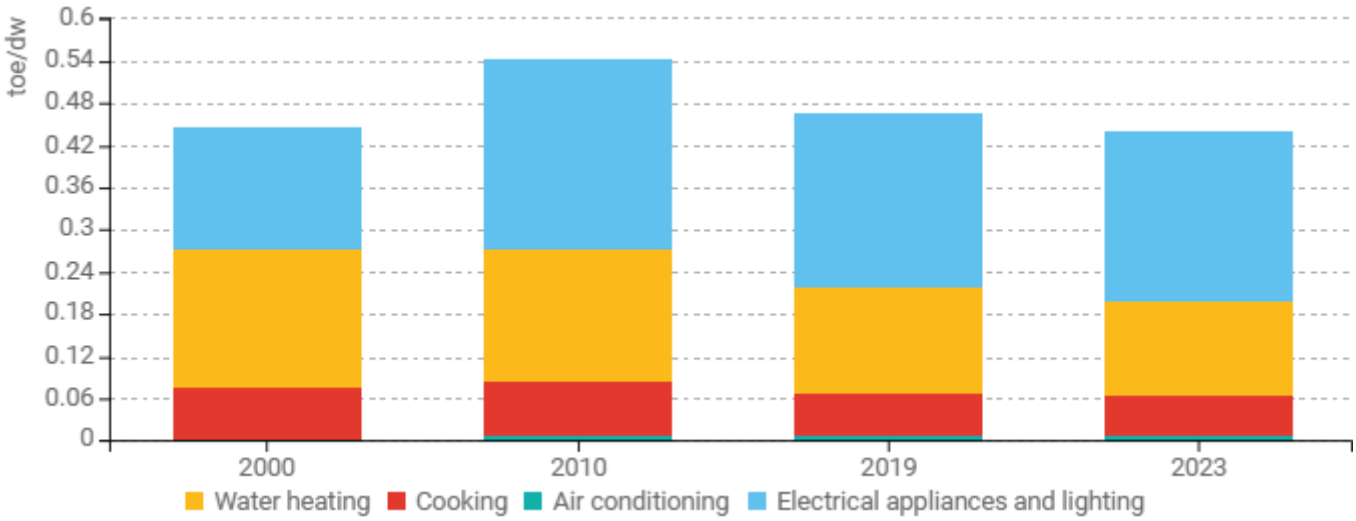
Source: ODYSSEE

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

The unit consumption of electrical equipment (including lighting) reached a turning point in 2010, following sustained growth (+4.5%/year), and has since declined (-0.9%/year) to 0.24 toe/dwelling in 2023. Unit consumption of DHW, cooking and air conditioning has also shown a downward trend since 2003, 2005 and 2008, respectively, with average annual improvements of between 0.9% (air conditioning) and 2.4% (DHW and cooking) in the period 2010-2023, with total unit consumption of 0.2 toe/dwelling in 2023. Electrical equipment accounts for 55% of domestic consumption (excluding heating) in 2023, 15.8 pp above 2000, while DHW accounts for 31%, following a decline of 13 pp. Cooking and air conditioning account for 13% and 2% respectively, with variations of -4.0 pp and +1.2 pp since 2000.

Figure 9: Energy consumption per dwelling by end-use (except space heating)



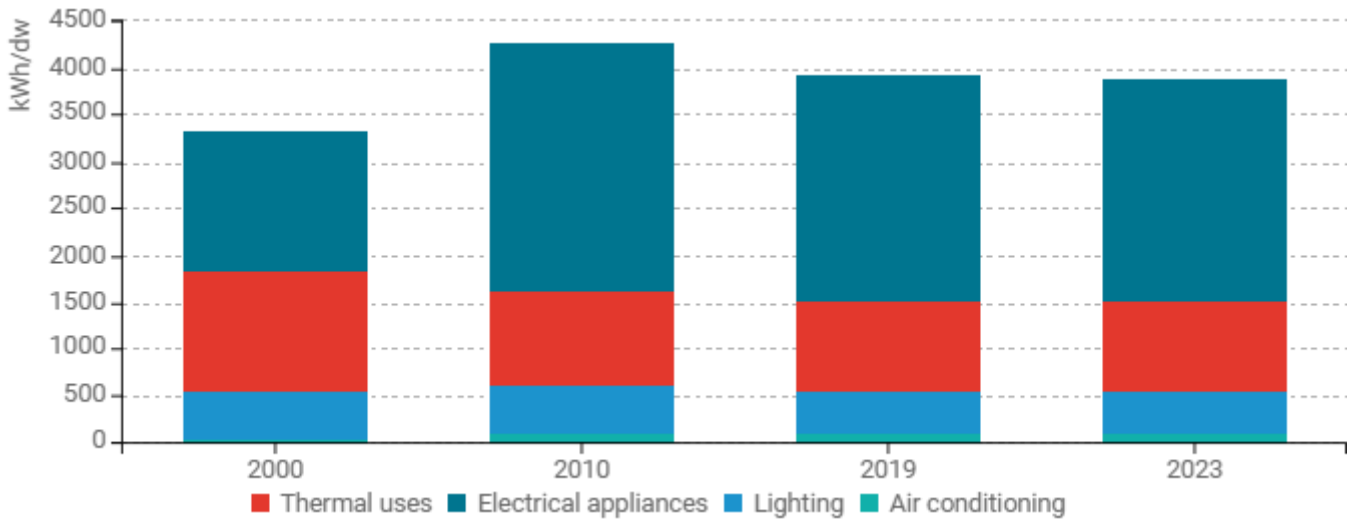
Source: ODYSSEE

The unit electricity consumption (including climate correction) of household appliances and air conditioning grew between 2000 and 2010 by 5.9% per year and 13.4% per year, respectively. Since 2010, all uses have decreased consumption between 0.3%/year (electric heating) and 0.9%/year (other uses). In 2023, unit electricity consumption in households will amount to 3,875 kWh/dwelling, 16.7% above 2000 and 9.1% below 2010. This reduction is partly due to efficiency improvements, especially in household appliances, which account for 61% of consumption, 15.9 pp above 2000 and 1.2 pp below 2010. Electric heating accounts for 25% of consumption, 1.4 pp above 2010, due in part to the rise of heat pumps.

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

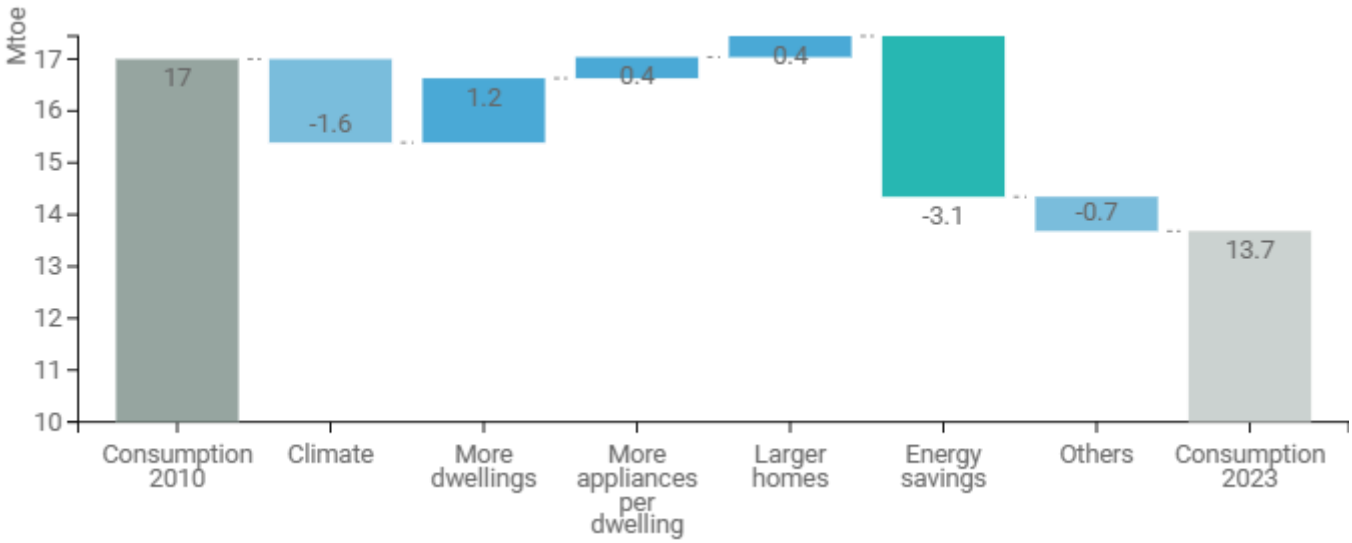
Figure 10: Electricity consumption per dwelling by end-use (with climatic corrections)



Source: Odyssee

In the period 2010-2023, energy consumption in the residential sector fell by 3.3 Mtoe, mainly due to energy savings (-3.1 Mtoe) resulting from efficiency improvements in homes and domestic equipment, encouraged by more stringent standards, as well as energy renovation measures promoted by various aid programs. Other factors have also contributed, such as the climate (-1.6 Mtoe), as a result of the increase in temperatures recorded in recent years, as well as more conservative behavioral changes induced by the impact of the crises during this period. These effects have been partially offset by the growth in the number of occupied dwellings (+1.2 Mtoe) and the higher level of comfort (+0.8 Mtoe), associated with equipment and a certain shift towards larger dwellings.

Figure 11: Main drivers of the energy consumption variation in households



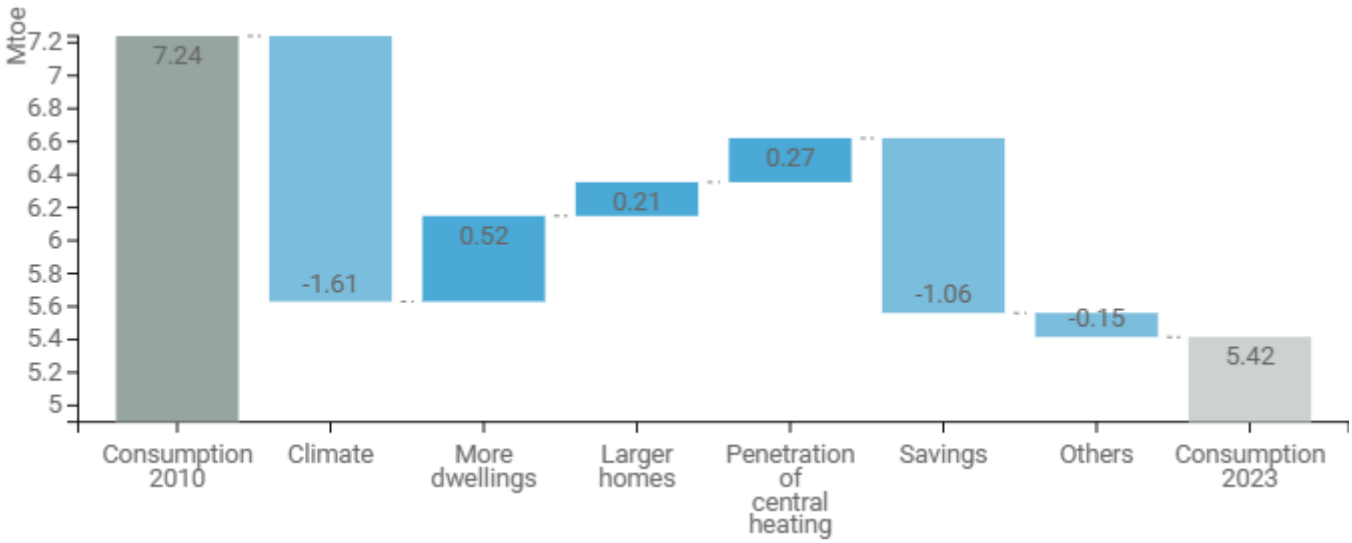
Source: ODYSSEE

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

In the period 2010-2023, heating consumption has fallen by 1.8 Mtoe, driven by milder weather (-1.6 Mtoe) and energy savings (-1.1 Mtoe) resulting from efficiency improvements in heating equipment, aided by the expansion of heat pumps and condensing boilers. To a lesser extent, behavioral changes (-0.1 Mtoe) in heating use have contributed, influenced by the effect of the crises during this period and mild winter temperatures. These effects have been partially offset by factors such as the growth in the number of occupied dwellings (+0.5 Mtoe) and increased comfort (+0.5 Mtoe), associated with the replacement of individual heating equipment with individual central heating systems, as well as a certain shift towards larger dwellings.

Figure 12: Main drivers of the space heating consumption variation of households



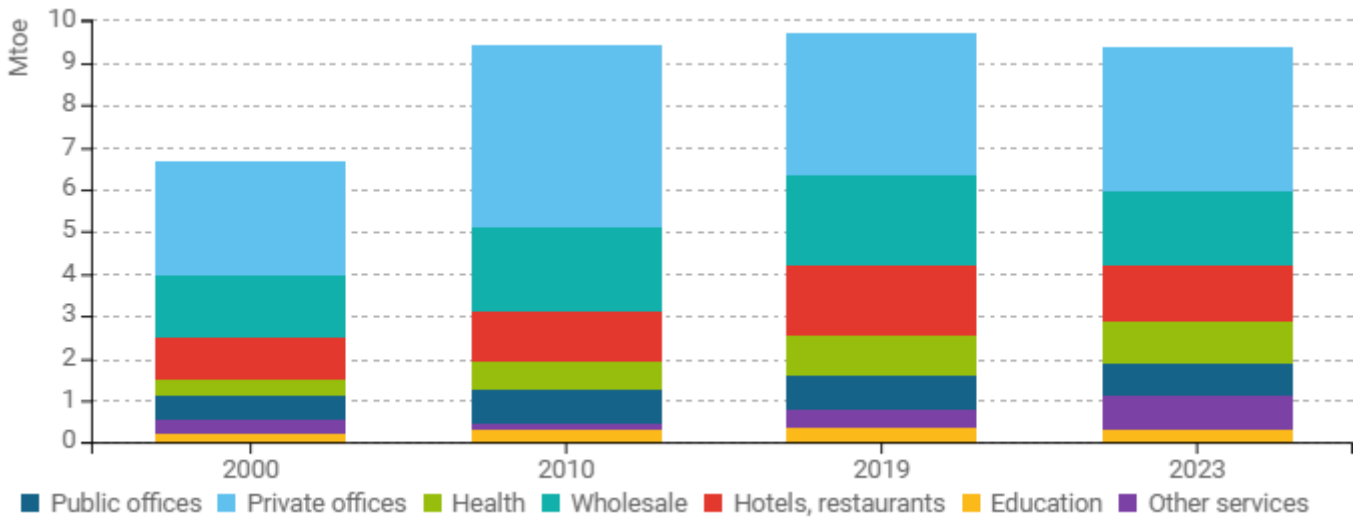
Source: Odyssee

In 2023, energy consumption in the service sector stands at 9.4 Mtoe, 41% higher than in 2000 and similar to 2010 levels. All branches have increased their consumption between 2000 and 2023, with rates ranging from 0.8%/year (commerce) to 3.8%/year (health). More than two-thirds of consumption in 2023 is concentrated in private offices (36%), commerce (19%) and hospitality (14%), whose combined share has fallen by 7.9 pp compared to 2000, mainly in private offices (-3.9 pp) and commerce (-3.2 pp). Among the remaining sectors, healthcare stands out with 10% of consumption in 2023, 4.2 pp above 2000.

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

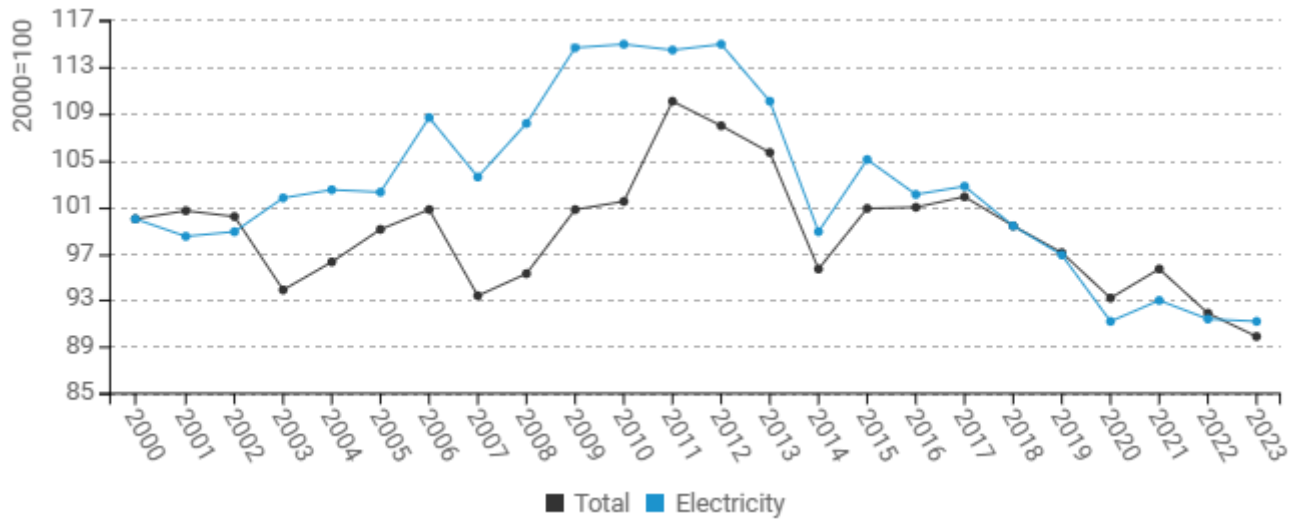
Figure 13: Final energy consumption of services by branch



Source: Odyssee

Between 2000 and 2010, unit electricity consumption (kWh/employee) in the service sector grew at a rate of 1.4% per year, compared to 0.15% per year for total consumption. Subsequently, both indicators reversed their trend, which is expected to continue until 2023, despite the disruptions caused by the effects of successive crises (economic, health and energy) and their subsequent recoveries. During this period, the improvement in unit electricity consumption (-1.8%/year) exceeds that of total consumption (-0.9%/year), which is attributed to the incorporation of more efficient electrical equipment, mainly in the most intensive sectors, as well as the adoption of energy management systems. In the last three years, however, the improvement in the total consumption indicator (-3.1%/year) is three times higher, due to the impact of the energy crisis on natural gas consumption.

Figure 14: Energy and electricity consumption per employee in services (with climatic corrections)



Source: ODYSSEE

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

In the buildings sector, the actions implemented follow the EU guidelines, particularly the Directives on Energy Efficiency (EED) and Buildings (EPDB). Regarding this latter directive, in recent years significant progress has been made in its transposition through different regulatory provisions that enhance the levels of efficiency requirements such as the Technical Building Code (Royales Decree 732/2019, 450/2022), the Regulation of Thermal Installations in Buildings (Royal Decrees 238/2013, 178/2021) and the Energy Certification of buildings (Royal Decrees 235/2013, 309/2021). Concerning the first directive, several measures have been implemented in accordance with articles 4, 5, 6 and 7. These include the Long-Term Strategy for Energy Rehabilitation in buildings in Spain (ERESEE 2020), measures aimed at the energy renewal of public buildings, such as the Programmes PIREP (Local and Autonómico), the Energy Transition Plan in the General State Administration (AGE) and the AGE Green Public Procurement Plan (PCPE), 2018-2025. Likewise, there are support measures, both legislative and economic, for rehabilitation in general, such as Law 10/2022 of 14 June, the PREE and PREE 5000 programmes, as well as the Aid programmes for residential rehabilitation and social housing (Royal Decree 853/2021).

Table 2: Sample of policies and measures implemented in the building sector

Measures	NECP measures	Description	Expected savings, impact evaluation
Aid program for energy rehabilitation in existing (PREE)	Yes	The Program included in the Recovery Plan (C2.I03), coordinated by the IDAE, which is responsible for monitoring the aid, managed by the Autonomous Communities, the direct beneficiaries of the aid for distribution among the final recipients of the aid, through the publication of the corresponding calls for applications in their territories. Regulated by Royal Decree 373/2020 of 4 August, the programme aims to boost the sustainability of existing buildings by means of actions on the thermal envelope, thermal and lighting installations in existing buildings in municipalities with demographic challenges, providing continuity to previous programmes (PAREER-CRECE, PAREER II). The Programme places special attention to the granting of aid to vulnerable groups and those affected by energy poverty. In addition, it seeks to promote the actions undertaken by renewable energy communities or citizen energy communities. It has a total budget of €402.5 M.	Medium
Programs for the rehabilitation and promotion of social and efficient housing (RD 853/2021)	Yes	These programmes, regulated by Royal Decree 853/2021, of 5 October, aim to contribute to the fulfilment of the objectives of the Recovery Plan in the areas of residential rehabilitation and construction of social housing, specifically in relation to investments C02.I01 "Rehabilitation programme for economic and social recovery in residential environments" and C02.I02 "Programme for the construction of housing for social rental in	High

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

		energy efficient buildings", both included within the component 2 "Implementation of the Spanish Urban Agenda: Urban rehabilitation and regeneration plan"	
Tax deduction applicable to investments in the renovation of homes and residential buildings (Law 10/2022) in the context of the Recovery Plan	Yes	This Law aims to address the challenges in terms of rehabilitation and improvement of the housing stock. To achieve this, it includes different measures, including tax deductions for investments in energy rehabilitation of homes and residential buildings, approved by Royal Decree-Law 19/2021 of 5 October, which establishes the approval of three types of deductions in personal income tax for energy efficiency improvement works in homes. These measures were consolidated by Law 10/2022 of 14 June on urgent measures to promote building renovation activity in the context of the Recovery Plan.	High
Energy Transition Plan in the General State Administration (AGE)	Yes	This Plan forms a global package of €1,070 M that aims to modernize public administrations in the field of ecological transition, in coherence with the European Green Deal and the Energy Efficiency Directive, including measures aimed at energy savings and efficiency of buildings and infrastructure, sustainable mobility and the deployment of renewable thermal and electrical energies in the AGE. This Plan is financed by the European Recovery and Resilience Mechanism to the extent that it is part of the Recovery Plan (PRTR), within investment 4 of component 11 “Modernization of Public Administrations” (C11.I4). For the execution of this Plan, Interdepartmental Agreements have been signed between the Secretary of State for Energy and different ministries.	Medium

Source: MURE

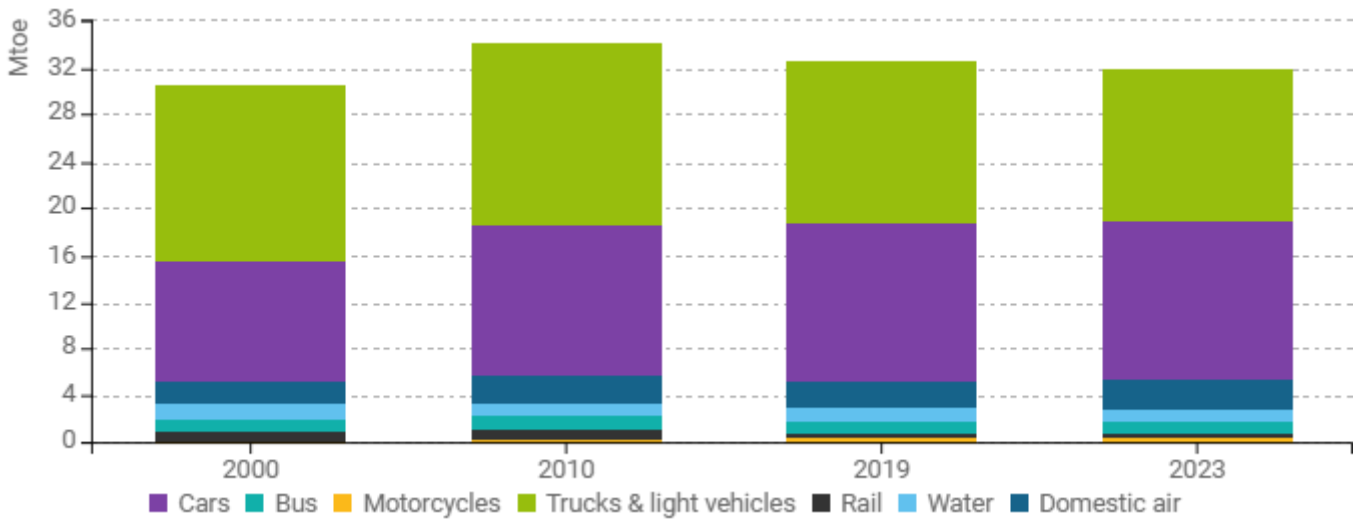
Transport

Road transport accounts for 87% of the sector's energy consumption in 2023, well above the other modes, whose share ranges from 1.0% (rail) to 8.3% (air). This predominance is due to the use of private vehicles (42%) and freight transport (41%). While the former have increased their share (+8.1 pp) since 2000, the latter have decreased (-8.3 pp). The other modes, except for air transport, have lost representation since 2000, from 1.3 pp (rail) to 1.8 pp (water).

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

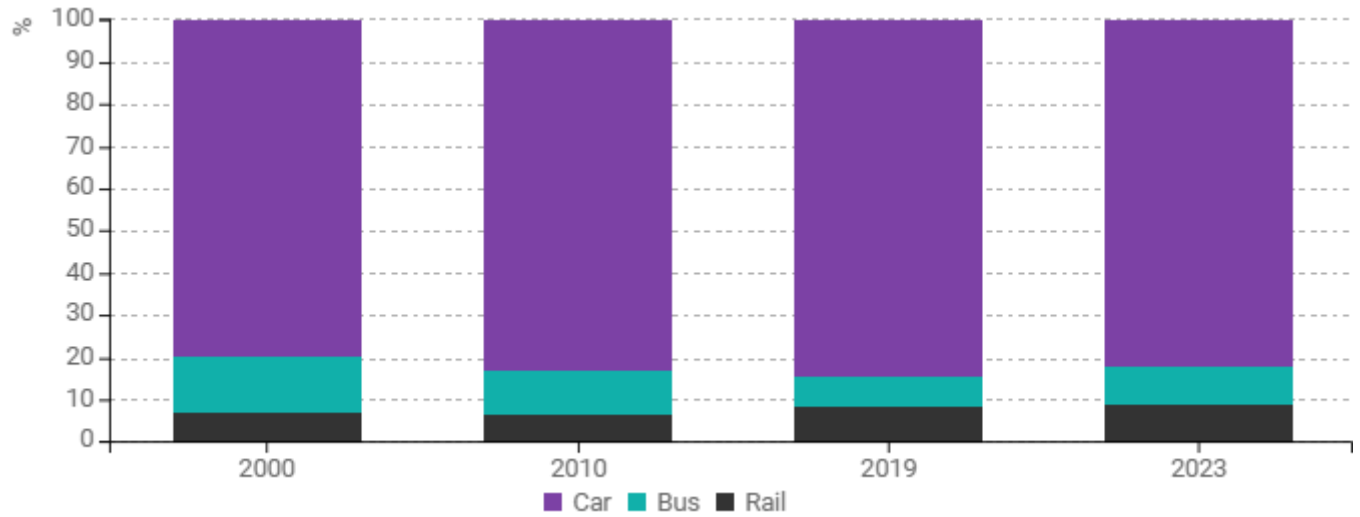
Figure 15: Transport energy consumption by mode



Source: ODYSSEE

Since 2000, passenger traffic has grown (+1.1%/year), mainly concentrated in private vehicles, whose share has increased by 2.4 percentage points, reaching 82% in 2023, which represents a certain stabilization since 2010. Public transport accounts for 18% (8.8% buses and 8.9% rail), 2.4 pp below 2000. However, since 2010 there has been some progress in public transport (+0.6 pp), driven mainly by rail (+2.7%/year), which has seen a notable increase in the last two years thanks to discounts applied in response to rising fuel prices.

Figure 16: Modal split of inland passenger traffic



Source: ODYSSEE

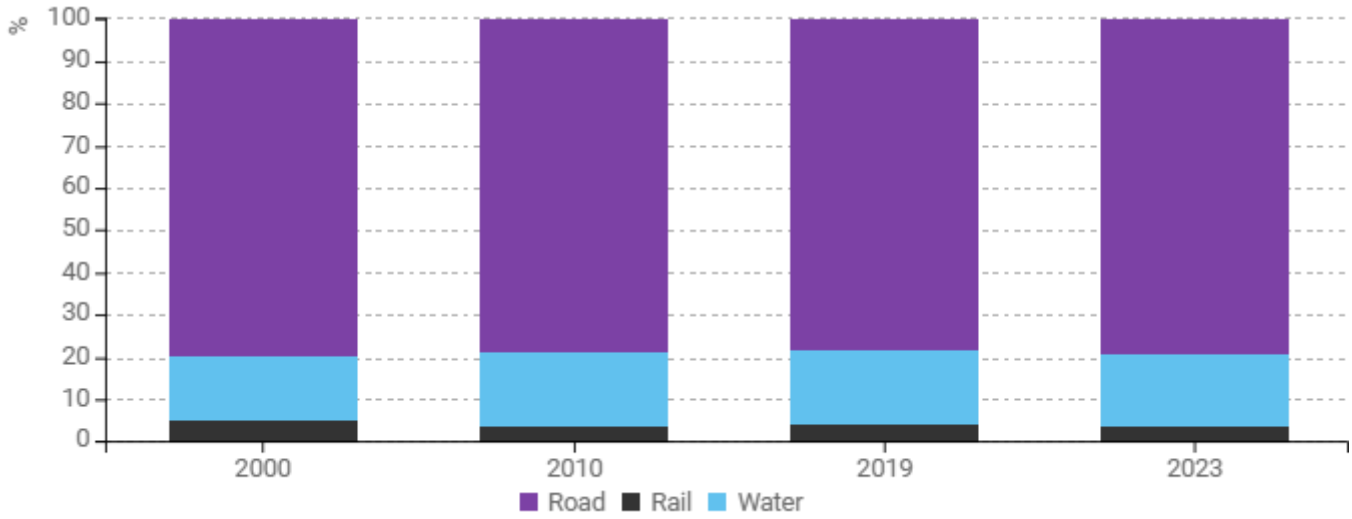
In the period 2000-2023, freight traffic has increased moderately (+0.7%/year), with road transport being the dominant mode, whose share (81%) remains virtually stable throughout the period. Maritime traffic has hardly

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

changed (+0.2 pp), accounting for 15.3% of total traffic in 2023. Rail traffic, unlike passenger traffic, has declined (-1.5 pp), accounting for 3.6% of traffic.

Figure 17: Modal split of inland freight traffic



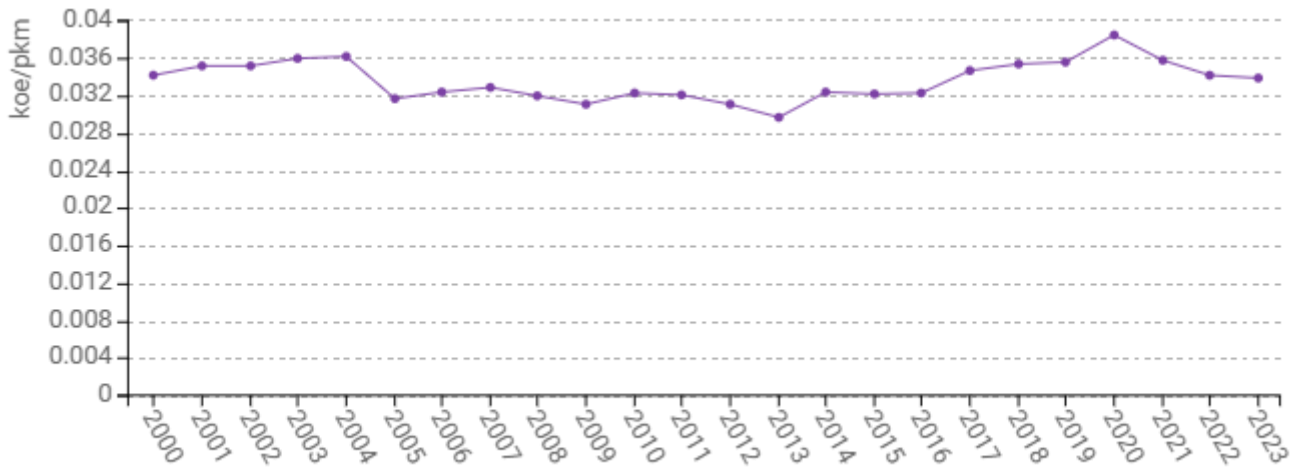
Source: ODYSSEE

The unit consumption of private vehicles in the period 2000-2023 shows a slight decrease of 0.8%, reaching a value of 0.034 toe/pkm in 2023. Various factors influence the evolution of consumption by these vehicles, such as their intensive use, the age of the vehicle fleet, changes in the economic situation, technological advances in the automotive industry and efficiency policies that contribute to the renewal of the vehicle fleet. The relevance of these factors varies depending on the period. Between 2006 and 2013, there was a downward trend (-1.2%/year), with some stabilization under the impact of the crisis that began in 2008. From 2014 onwards, coinciding with the economic recovery, the trend changed, with an increase in consumption (+2.9%/year) that continued until 2020. This increase is due to the greater mobility recorded between 2014 and 2019, a period followed by a sharp drop in mobility greater than that of consumption, because of the restrictions imposed by the health crisis. From 2021 onwards, the indicator falls again (-2.6%/year), due in part to problems associated with the supply chain, especially between 2021 and 2022, as well as the effects of inflation and rising fuel prices.

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

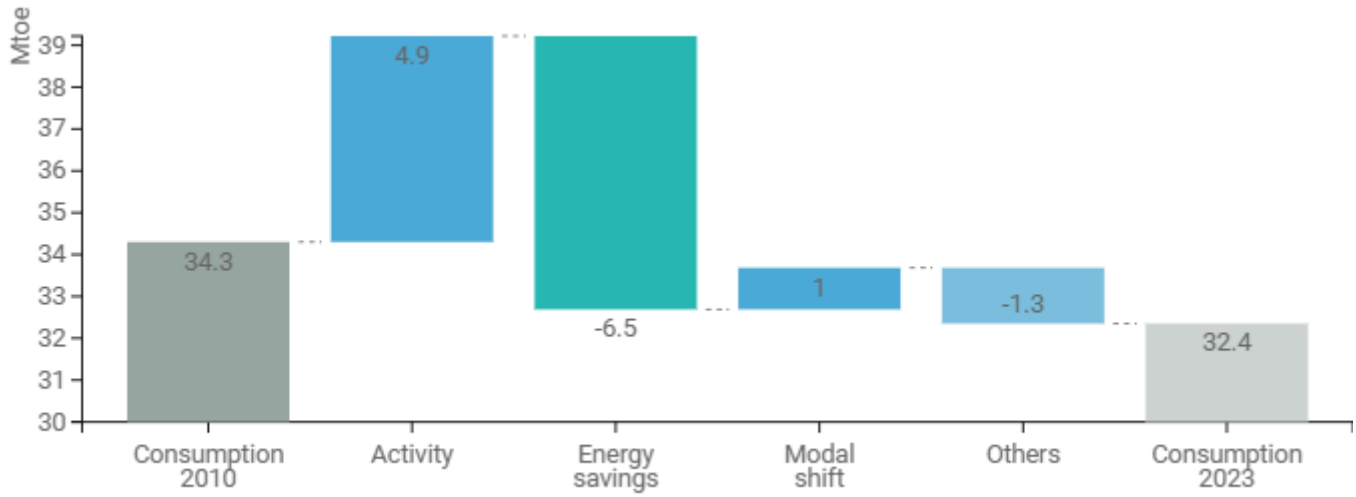
Figure 18: Energy consumption of cars per passenger-km



Source: ODYSSEE

Between 2010 and 2023, energy consumption in transport has fallen by 2.0 Mtoe, mainly due to improvements in efficiency (-6.4 Mtoe) driven by technological advances, together with the effect of changes in driver behavior and improvements in the management of freight transport (-1.3 Mtoe), especially in periods of economic downturn. These effects have been partially offset by the increase in mobility associated with economic activity which, despite the various crises, has led to an increase in consumption (+4.7 Mtoe), as well as by the negative contribution of modal shift (+1.0 Mtoe) with limited participation of the most efficient modes and means of transport.

Figure 19: Main drivers of the energy consumption variation in transport



Source: ODYSSEE

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

Energy efficiency measures in the transport sector fall into three typologies: improving the efficiency of transport modes, with an emphasis on road transport through the renewal and/or electrification of vehicles; the promotion of modal change towards less energy-consuming modes; and the efficient use of means of transport. Concerning the first type, the vehicle acquisition aid programs stand out (MOVES, MOVES Singulares, MOVES FLOTAS, the Program for the sustainable transformation of freight and passenger fleets (Royal Decree 983 /2021, 16 November)) within the second type, the Aid Program for municipalities for the implementation of low-emission zones and the Program for the digital and sustainable transformation of urban transport deserve a mention. Regarding the third type, since 2014 the training system to get the driving license for private and industrial vehicles includes driving techniques. Likewise, the use of clean and efficient vehicles is encouraged through a registration tax on CO2 emissions and the classification of vehicles according to their emissions. Within the framework of the NECP, there is a commitment to modal change, traffic reduction, the use of collective public transport, sustainable mobility, and the electrification of transport. Likewise, the recent review of the NECP delves into changes in transport and sustainable mobility, with emphasis on the transformation of cities. In addition, reinforcing the commitment to public and collective transport and the railway, among others.

Table 3: Sample of policies and measures implemented in the transport sector

Measures	NECP measures	Description	Expected savings, impact evaluation
MOVES II-III program for incentives for efficient and sustainable mobility	Yes	The MOVES Program aims to finance actions to support mobility based on criteria of energy efficiency, sustainability, and promotion of alternative energies, including the provision of vehicle charging infrastructure electrical. The second and third editions are endowed with a joint budget of €1,669.83 M. In the second edition, the eligible actions are expanded, considering among them the acquisition of electric and fuel cell demo vehicles of categories M1 and N1 up to 9 months old. Likewise, the limit price of a passenger vehicle to be eligible is increased, as well as the maximum budget for heavy gas vehicles. On the other hand, vehicle scrapping is no longer mandatory. Regarding the third edition, some of the modifications are the greatest incentive effect, by increasing the aid intensities for the ultimate recipients not subject to the General Block Exemption Regulation, the increase in aid for electric vans and motorcycles for individuals, autonomous and administration, and expanding the eligibility of demo vehicles to motorcycles.	Medium
MOVES Singular II Program	Yes	The MOVES SINGULAR II Programe, coordinated by the IDAE, aims to grant, on a competitive basis, aid to technological development projects and innovative experiences in electric mobility that serve to promote the technological leap towards electric and fuel cell	Medium

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

		vehicles, encouraging the development of projects by Spanish companies in order to achieve the technological maturity that will facilitate their commercialization. This program, implemented through two calls for proposals, has a total budget of €364 million from the Recovery Plan (PRTR) and contributes to Component 1 'Sustainable, safe and connected mobility plan in urban and metropolitan environments' of the PRTR.	
Aid program to municipalities for the implementation of low-emission zones and the digital and sustainable transformation of urban transport	Yes	This program aims to subsidize actions that contribute to the achievement of specific objectives, linked to the general objectives of component 1 of the Recovery Plan (PRTR): Decarbonization and digitalization of urban mobility. This program, financed by the PRTR, is developed through two calls for aid with a total amount of €1.5 M. The programme includes four lines of action: Implementation of Low Emission Zones in provincial capitals and municipalities with more than 50,000 inhabitants; promotion of modal change in urban and metropolitan environments towards more sustainable means of transport, prioritizing collective public transport and active mobility; transformation of public transport of passengers and goods towards a zero-emission activity; and digitalization of the activity of public transport services.	Medium
Program for the sustainable transformation of freight and passenger fleets	Yes	This programme seeks to accelerate investments to facilitate the sustainability of transport. In this way, it aims to promote the decarbonization of professional road transport by renewing the fleet of heavy goods and passenger transport vehicles (excluding those of public ownership), encouraging the penetration of vehicles powered by alternative energies (low-carbon vehicles (electric, hydrogen, hybrid and plug-in hybrid and gas vehicles (LNG or CNG)), as well as promoting the automotive sector and industrial reactivation. This programme with a maximum allocation of 400 M is financed with the European Recovery and Resilience Mechanism to the extent that it is part of the Recovery Plan (PRTR), within investment 1 of component 1 "Sustainable mobility shock plan, safe and connected in urban and metropolitan environments.	Medium
Law 9/2025, of 3 December, on Sustainable Mobility	Yes	Law 9/2025, of 3 December, on Sustainable Mobility, in force since 5 December 2025, aims to establish the necessary conditions for citizens and public or private entities to have access to a sustainable, fair and inclusive mobility system as a tool for achieving greater social and territorial cohesion, contributing to resilient economic development and achieving the objectives of	High

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

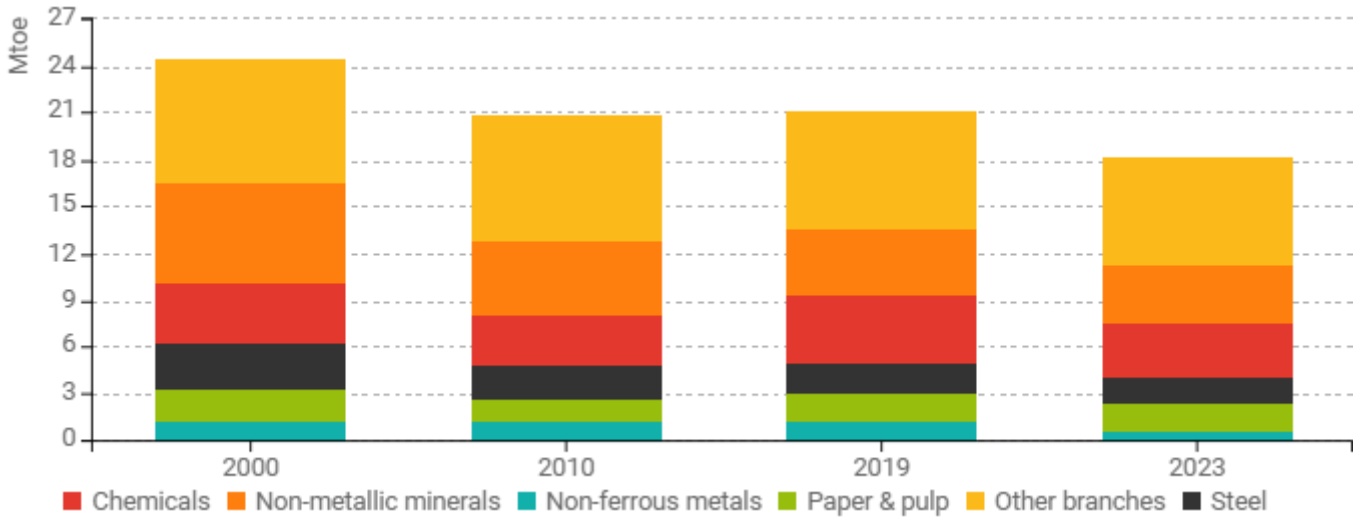
		reducing greenhouse gases (GHG) and other pollutants and improving air quality. This regulatory framework is structured around four strategic pillars — recognition of the right to sustainable mobility; promotion of clean and healthy mobility; creation of a digital and innovative system; and improvement of efficiency and transparency in public investment — which are linked to a set of guiding principles that orient the actions of public administrations and private agents in the transport and mobility system.	

Source: MURE

Industry

Energy consumption in industry amounts to 18.2 Mtoe in 2023, 1.7% lower than in 2022, and 14% and 26% below pre-COVID-19 and 2000 levels, respectively. The slowdown compared to the decline observed in 2022 (-10.2%) is due to lower inflation and energy prices. Metallurgy (steel and non-ferrous metallurgy) and non-metallic minerals have recorded the largest reductions since 2000 (>-2%/year). Since 2010, chemicals have stood out for their greater decline (-3.3%/year), although in the period 2019-2023, metallurgy leads the reduction (-8.2%/year), followed by chemicals (-5.5%/year), under the effect of the health and energy crises. Five sectors account for 62% of consumption: non-metallic minerals (21%), chemicals (19%), iron and steel (9%), non-ferrous metallurgy (3%), and pulp and paper (10%). The share of metallurgy and non-metallic minerals has decreased by around 5 pp since 2000, while that of chemicals has increased by 3.5 pp.

Figure 20: Final energy consumption of industry by branch



Source: ODYSSEE

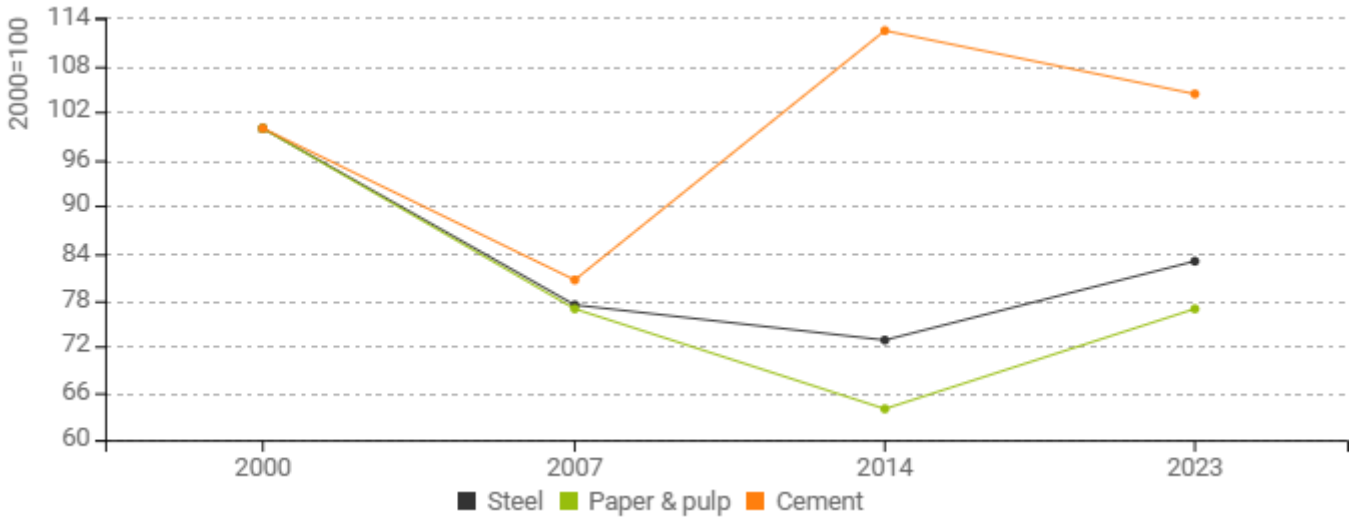
Among intensive industries, there is a notable downward trend in unit consumption in the paper industry (-1.1%/year) and the steel industry (-0.9%/year) in the period 2000-2023. The cement industry, despite its strong performance prior to the economic crisis, shows a more unfavorable trend over the whole period, with a decline

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

of 0.2%/year, due to its link to construction activity, which was severely affected by the 2008 crisis. However, since 2010 it has shown improved performance, with a tendency towards stabilization between 2010 and 2018, followed by an annual decline of 4.3% since 2018, reinforced by the effects of the health and energy crises. In contrast, the other sectors have deteriorated since 2010 by between 1.3%/year (steel) and 3.6%/year (paper), with this deterioration being more moderate for the steel industry in the last four years due to the recent crises.

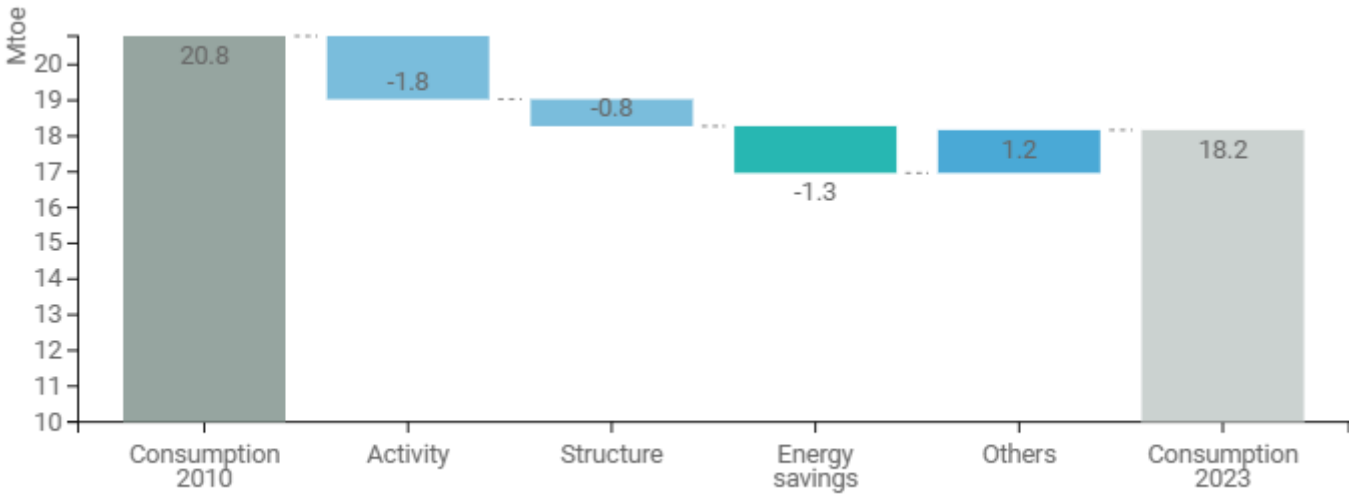
Figure 21: Unit consumption of energy-intensive products (toe/t)



Source: ODYSSEE

In the period 2010-2023, energy consumption in industry fell by 2.6 Mtoe, driven mainly by efficiency improvements (-1.5 Mtoe), the decline in activity (-1.3 Mtoe), accentuated during the various crises—economic (2008-2014) and health (2020)—and, to a lesser extent, by structural changes (-0.9 Mtoe) towards less intensive sectors during this period. These effects have been partially offset by operational inefficiencies (+1.0 Mtoe) induced by the various crises, especially in the period 2008-2014.

Figure 22: Main drivers of the energy consumption variation in industry



The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

Source: ODYSSEE

Actions to improve energy efficiency in the industrial sector, generally framed within the different efficiency plans, and more recently within the NECP, aim to promote investments in efficiency projects through technological improvements and the implementation of energy management systems and audits. Current measures include the aid program for SMEs and large companies, the obligation to carry out audits in large companies and the aid lines of the Recovery Plan. The latter include aid for innovation and sustainability plans, as well as for actions within the Strategic Projects for Economic Recovery and Transformation (PERTE) of the Electric and Connected Vehicle (PERTE VEC), the naval sector (PERTE Naval), and the PERTE for Industrial Decarbonization. The new PNIEC, as a novelty, contemplates improvements in technology and process management systems in energy-intensive industries.

Table 4: Sample of policies and measures implemented in the industry sector

Measures	NECP measures	Description	Expected savings, impact evaluation
Aids to SMEs and large companies in the industrial sector	Yes	This Program, currently endowed with a total budget of €658,08 M, is aimed at financing actions corresponding to the following typologies: improvement of technology in industrial equipment and processes; and implementation of energy management systems.	High
Energy audits and management systems	No	In compliance with Royal Decree 56/2016, of 12 February, which transposes article 8 of the EED, the obligation to carry out energy audits is imposed on large industrial companies (or groups of companies that meet this requirement). The audits must be carried out every 4 years, covering at least 85% of the final energy consumption of all the facilities that are part of the activities managed by the affected companies and groups.	Medium
Line of comprehensive action aid for the decarbonization of the manufacturing industry as part of the Industrial Decarbonization PERTE	Yes	This program aims to promote the decarbonization of industrial production processes, improve energy efficiency through the incorporation of the best available technologies and the implementation of energy management systems in industries, encourage the use of renewable energy, and strengthen the competitiveness of the manufacturing industry. The program has a current budget of €999.8 M, funded by the Recovery Plan (PRTR), and contributes to meeting the milestones set out in Investments 5 and 7 of Component 31, “REPowerEU Chapter,” of the Plan.	High

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union

Line of aid for the development of highly efficient and decarbonized manufacturing facilities as part of the PERTE for Industrial decarbonization	Yes	This program aims to promote the operation of new facilities or new complete decarbonized production lines in the sectors and products that emit the most greenhouse gases, in the industrial activities included in the Emissions Trading Scheme. The aid regulated by Order ITU/831/2024 of 2 August will be granted through a competitive process and may take the form of grants, loans or a combination of loans and grants. The Ministry of Industry and Tourism (MINTUR) is responsible for managing and announcing this aid. This program has a budget of €104 million, sourced from the Recovery Plan (PRTR), and contributes to the achievement of the milestones set out in Investments 5 and 7 of Component 31 'REPowerEU Chapter' of the Plan.	High

Source: MURE

The ODYSSEE-MURE project is co-funded by the European Union.
Views and opinions expressed are those of the authors only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for the information contained therein or for any use that may be made thereof.

Co-funded by the European Union